

REMARKS

A. Status of the Claims

Claims 13 and 15-36 were pending at the time of the Action. Claims 13, 19, 22 and 28 are amended herein. Support for the amendments can be found, at least, in the claims as filed and Example 6 of the specification. No new matter is added.

B. Claim Objection

The Action objects to claims 19 and 22 for the recitation of “8-endotoxin”. Claims 19 and 22 have been amended here in to recite “ δ -endotoxin”. The rejection is therefore believed moot and withdrawal thereof is respectfully requested.

C. Rejections Under 35 U.S.C. § 103

1) The Action rejects claims 13, 15-27 and 33-36 under 35 U.S.C. § 103(a) as obvious over Cohen *et al.* (*International Rice Research Notes* 2000, vol. 25, pages 4-10). In particular, it is asserted that Cohen *et al.* teach seed blends comprising a first transgenic crop seed with an insecticidal transgene and a refuge seed that does not comprise an insecticidal transgene and that 4-20% of a crop must be the refuge plant. The Action thus finds that it would be obvious to modify the seed blends of Cohen *et al.* to arrive at the claimed invention. Applicants respectfully traverse for at least the reasons set forth below.

The cited reference fails to teach or suggest the claimed subject matter. For instance, claim 13 currently recites:

A seed blend comprising refuge seeds and at least one variety of transgenic crop seeds for use in planting in a field, wherein said seed blend comprises a refuge seed and a first transgenic crop seed in a uniform mixture; wherein said mixture consists of from about 80% to about 99% first transgenic crop seed, wherein the first transgenic crop seed comprises a first insecticidal transgene and a second insecticidal transgene, and wherein said refuge seed does not contain the first and

second insecticidal transgenes, and further wherein at least one of the insecticidal transgenes is insecticidal to a lepidopteran insect.

While Cohen *et al.* is cited to disclose seed blends comprising a transgenic seed and a refuge seed, the reference actually teaches away from such blends for use against *mobile target pests*. For instance, Cohen *et al.* state that:

Within-field mixtures are *not* the best type of refuge for *insects that move between plants* during development. This is because some of the insects will feed on the Bt and non-Bt plants, thereby “diluting” the high-dose titer in Bt plants.

Cohen *et al.*, page 5, second column, third full paragraph, emphasis added.

It is well known that lepidopteran insects are highly mobile, easily moving from one plant to the next. The claimed seed blends comprising an insecticidal transgene against a lepidopteran insect would therefore not be expected to be successful, as one would expect the insects to move between those plants containing the insecticide and those not, feeding on both. From the above passage it is clear that one of skill in the art would expect such cross-plant feeding to lead to a failure in pest control.

In fact, Cohen *et al.* specifically state that the best resistance strategy for Yellow Stem Borers (YSB) and Striped Stem Borers (SSB), both of which are insects from the order lepidoptera, is to plant refuge plants in *separate fields, not in blends* (“maintaining *separate refuge fields* within 1 km of Bt rice fields would be a suitable form of refuge.”) (Cohen *et al.*, page 5, second column, fourth full paragraph, emphasis added). Cohen *et al.* therefore in no way teach or suggest the claimed invention, and in fact specifically teach away from it.

Furthermore, at the time of filing, seed blends were not believed to be suitable for use as evidenced by Lambert *et al.* (*Proc. Beltwide Cotton Conf.*, 1996, vol. 2, pages 931-935). For instance, Lambert *et al.* state that seed blends are not practical, indicating that “treatments incorporating blends of B.t. and non-B.t. seed (85:15 and 75:25) sustained *too much fruit*

damage and yield loss for the blended seed concept to be practical (Lambert *et al.*, page 933, second column, first paragraph, emphasis added). In particular, Lambert *et al.* found that:

Numbers of larvae and *fruit damage increased* as the percentage of *B.t.* seed in the blends decreased. Conversely, seed cotton *yields decreased* as the percentage of *B.t.* seed in the blends decreased.

Lambert *et al.*, page 932, second column, fifth full paragraph, emphasis added.

The reference further refers to other studies with the same findings:

The results of this field study were similar in many respects to those obtained in filed studies conducted earlier in North Carolina (Mahaffey *et al.*, 1994, 1995) where various *B.t. seed blends (75-100% B.t. seed) were damaged by bollworm to the extent that significant yield reductions (ca. 10-20%) resulted.*

Lambert *et al.*, page 932, second column, sixth full paragraph, emphasis added.

Additionally, Lambert *et al.* and references cited therein, specifically teach away from the use of seed blends targeting mobile lepidopteran insects. For instance, on page 933, second column, first paragraph Lambert *et al.* state:

Mallet and Porter (1992) suggested that *seed mixtures may enhance resistance development in mobile insects.* Thus it is likely that refugia will have to be accomplished through some *means other than the blended seed strategy* for bollworm.

In sum, Cohen *et al.* do not teach or disclose the claimed invention and if anything teach away from it. This, in combination with the teaching away in the art in general, such as in Lambert *et al.* and multiple references cited therein, fully establishes the non-obviousness of the claimed invention. The rejection is thus believed moot and withdrawal thereof is respectfully requested.

2) The Action rejects claims 29-31 under 35 U.S.C. § 103(a) as obvious over Cohen *et al.* (*International Rice Research Notes* 2000, vol. 25, pages 4-10) in view of English *et al.* (U.S. Patent No. 6,023,013). For instance, it is stated that Cohen *et al.* teach seed blends and

English *et al.* teach modified Cry3Bb genes, conferring resistance to southern and western corn rootworms. The Action therefore finds that it would be obvious to combine the references to arrive at the claimed invention. Applicants respectfully traverse for at least the reasons set forth below.

The cited references do not render claim 13 obvious, which claims 29-31 directly or indirectly depend upon, and thus these claims are similarly nonobvious. In particular, as described above, Cohen *et al.* specifically teach away from seed blends involving transgenes insecticidal against a lepidopteran insect. As explained above, for example, Cohen *et al.* teach that refuge plants in *separate fields* is most appropriate for pest control of insects that move between plants, such as lepidopteran insects, and thus teaches away from the claimed invention.

Furthermore, the state of the art at the time of filing was such that one of skill in the art would have no expectation of success in planting seed blends with transgenes insecticidal to lepidopteran insects. For instance, as detailed above, Lambert *et al.* teach that seed blends result in *increased fruit damage and decreased seed yield*, stating that use of *seed blends is impractical*, especially for mobile insects such as lepidopteran insects. Lambert *et al.* also reference several other studies with similar results and conclusions, each teaching away from the claimed seed blends.

English *et al.* is cited to teach modified Cry3Bb transgenes that confer resistance to rootworms. The reference, however, does not teach any seed blend or cure the defects of Cohen *et al.*

In view of the above, the rejection is believed moot and thus withdrawal thereof is respectfully requested.

3) The Action rejects claims 27-28 and 32 under 35 U.S.C. § 103(a) as obvious over Cohen *et al.* (*International Rice Research Notes* 2000, vol. 25, pages 4-10) in view of English *et al.* (U.S. Patent No. 6,023,013) and further in view of Narva *et al.* (U.S. Patent No. 6,083,499). In particular, it is asserted that Cohen *et al.* teach seed blends, English *et al.* teach modified Cry3Bb genes and Narva *et al.* teach PS149B1 toxins conferring resistance to western corn rootworm. The Action thus finds that it would be obvious to combine the references to arrive at the claimed invention. Applicants respectfully traverse for at least the reasons set forth below.

The cited references do not render claim 13 obvious, which claims 27-28 and 32 directly or indirectly depend upon, and thus these claims are similarly nonobvious. In particular, as described above, Cohen *et al.* do not teach or suggest seed blends comprising at least one transgene with insecticidal activity against a lepidopteran insect and in fact, teach away from such a seed blend. Similarly, Lambert *et al.* and several references cited therein teach away from the claimed invention as well.

Neither English *et al.* nor Narva *et al.* cure these defects. In particular, English *et al.* and Narva *et al.* are cited to disclose toxins conferring resistance to corn rootworms but do not teach or suggest seed blends in any manner.

In view of the above, the rejection is believed moot and withdrawal thereof is respectfully requested.

4) The Action rejects claims 13, 15-27, 29-30 and 33-36 under 35 U.S.C. § 103(a) as obvious over Maqbool *et al.* (*Molecular Breeding*, 1999, vol. 5, pages 471-480) in view of Cohen *et al.* (*International Rice Research Notes* 2000, vol. 25, pages 4-10). For instance, it is stated that Maqbool teach rice plants comprising three insecticidal transgenes conferring resistance to lepidopterans and coleopterans and that Cohen *et al.* teach seed blends. The Action

thus finds that it would be obvious to provide the seed of Maqbool *et al.* in blends with a refuge plant as disclosed in Cohen *et al.* to arrive at the claimed invention. Applicants respectfully traverse for at least the reasons set forth below.

The cited references, either in combination or alone, do not teach or suggest the claimed invention. For instance, as detailed above, Cohen *et al.* do not suggest the use of seed blends to control mobile insects, such as lepidopteran insects, and instead teach against this approach.

Further, other references at the time of filing taught away from the claimed seed blends comprising a transgenic seed with at least one transgene insecticidal to a lepidopteran insect. For instance, Lambert *et al.*, discussed in detail above, disclose that seed blends are not a practical pest control strategy and specifically teach away from the use of seed blend for control of lepidopteran insects, referring to studies with conclusions. The art at the time of filing therefore taught away from the claimed seed blends.

Maqbool *et al.* is cited to disclose transgenic plants comprising multiple insecticidal transgenes, but the reference does not cure the above defects or teach seed blends in any manner. The cited references therefore fail to teach or suggest the claimed invention, and instead teach away from it. Withdrawal of the rejection is thus respectfully requested

D. Obviousness-Type Double Patenting Rejection

The Action rejects claims 13 and 15-36 under the doctrine of non-statutory obviousness-type double patenting over claims 19-40 of U.S. Patent No. 6,551,962. Applicants respectfully traverse and request that the rejection is held in abeyance until allowable subject matter is obtained.

E. Conclusion

In light of the foregoing, Applicants submit that the case is in condition for allowance, and an early indication to that effect is earnestly solicited.

The examiner is invited to contact the undersigned (214) 259-0931 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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